WHAT IS CLAIMED:

1. A shift progression target command generator for a closed-loop controller for a multiple-ratio automatic transmission for an automotive vehicle, the transmission comprising:

two gearsets for providing multiple torque flow paths between an engine and vehicle traction wheels, each gearset being characterized by at least two ratios that define multiple overall transmission ratios;

each gearset including a pressure-actuated friction element for establishing an upshift and a downshift between the two ratios;

a first closed-loop controller for controlling pressure at the pressure-actuated friction element of one gearset; and

a second closed-loop controller for controlling pressure at the pressure-actuated friction element of the other gearset;

one gearset being upshifted as the other gearset is simultaneously downshifted, thereby effecting a swap-shift in an overall transmission ratio;

a shift progression and shift progression rate processing unit for the other gearset;

the generator computing a command for one of the gearsets based on a first shift progression target for the one gearset, the first shift progression target corresponding to a first shift progression target for the other gearset, whereby shift progression of the one gearset is dependent on shift progression and shift progression rate of the other gearset;

the target command generator using multiple sets of shift progression target values for the gearsets, each

target value for the one gearset being dependent upon a target value for the other gearset;

the first and second controllers having dynamic interaction whereby a pressure change in one of the friction elements will command a pressure change in the other friction element during progression of the swap-shift, which results in improved quality of the swap-shift in the overall transmission ratio.

2. The automatic transmission set forth in claim 1 wherein the one gearset is downshifted and the other gearset is upshifted as the overall transmission ratio is upshifted.

3. The automatic transmission set forth in claim 1 wherein the one gearset is upshifted and the other gearset is downshifted as the overall transmission ratio is downshifted.

4. The automatic transmission set forth in claim 1 wherein the controllers are speed-based, the transmission comprising a torque input element for the first gearset and a first speed sensor for monitoring the speed of the torque input element;

an intermediate shaft connecting a torque output element of the one gearset to a torque input element of the other gearset; and

a second speed sensor for monitoring the speed of the intermediate shaft;

the transmission further comprising an output shaft drivably connected to the vehicle traction wheels and a third speed sensor for monitoring the speed of the output shaft;

the controllers responding to speed information from the speed sensors to implement synchronization of an upshift and a downshift of the one gearset and the other gearset during a swap-shift in an overall transmission ratio.

5. The automatic transmission set forth in claim 1 wherein the simultaneous upshifting and downshifting of each gearset during a swap-shift occurs as the controllers control pressure at each friction element in a closed-loop fashion during progression of the swap-shift when engine power is being delivered to the traction wheels.

6. The automatic transmission set forth in claim 5 wherein the one gearset is downshifted and the other gearset is upshifted as the overall transmission ratio is upshifted.

7. The automatic transmission set forth in claim 5 wherein the one gearset is upshifted and the other gearset is downshifted as the overall transmission ratio is downshifted.

8. A method for generating a control command in a control command generator for a speed-based control system of a multiple-ratio automatic transmission in a powertrain for an automotive vehicle, the automatic transmission including two gearsets controlled by pressure actuated friction elements to establish multiple torque flow paths between an engine and vehicle traction wheels, the method comprising the steps of:

measuring the input speed of one gearset and the input and output speeds of the other gearset;

computing shift progression and shift progression rate of the other gearset continuously during a gear ratio shift of the other gearset;

each gearset having separate shift controllers;

computing a shift progression rate of the other gearset continuously during a gear ratio shift of the other gearset;

transferring shift progression and shift progression rate information to the control command generator;

computing a desired shift progression of the one gearset as a function of shift progression of the other gearset and the rate of shift progression of the other gearset;

computing a desired input speed of the one gearset as a function of the shift progression of the one gearset and the input speed of the other gearset; and

measuring an error between the computed desired input speed and an actual input speed of the one gearset whereby pressure applied to the friction element of the one gearset is controlled to achieve synchronized timing of a ratio change in the one gearset relative to a ratio change in the other gearset.

9. The method set forth in claim 8 wherein the computation of desired shift progression for the one gearset and the computation of a shift progression for the other gearset are made during an overall shift progression whereby the control of pressure on the friction element of the one gearset is subordinated at each selected target point to the control of pressure on the friction element of the other gearset.

10. The method set forth in claim 9 wherein the control of friction element pressure using pressure commands is a closed-loop control, control of pressure commands for the one gearset ending before the end of closed-loop control of pressure commands for the other gearset and the control of pressure commands for the one gearset beginning after the start of closed-loop control of pressure commands for the other gearset.

11. The method set forth in claim 9 wherein the desired input speed for the one gearset is computed as a function of a desired shift progression for the one gearset, output speed of the one gearset, the starting ratio for the one gearset and the final ratio of the one gearset.

12. The method set forth in claim 10 wherein the desired input speed for the one gearset is computed as a function of a desired shift progression for the one gearset, output speed of the one gearset, the starting ratio for the one gearset and the final ratio of the one gearset.

13. The method set forth in claim 9 wherein the shift progression and shift progression rate for the other gearset are computed using input and output speeds of the other gearset, starting ratio and final ratio of the other gearset and the derivative of the shift progression of the other gearset.

14. The method set forth in claim 10 wherein desired input speed for the one gearset is computed as a function of a desired shift progression for the one gearset, output speed of the one gearset, starting ratio for the one gearset and the final ratio of the one gearset.

15. The method set forth in claim 11 wherein shift progression and shift progression rate for the other gearset are computed using the input and output speeds of the other gearsets, starting and final ratios of the other gearset and the derivative of the shift progression of the other gearset.

16. The method set forth in claim 12 wherein shift progression and shift progression rate for the other gearset are computed using the input and output speeds of the other gearsets, starting and final ratios of the other gearset and the derivative of the shift progression of the other gearset.